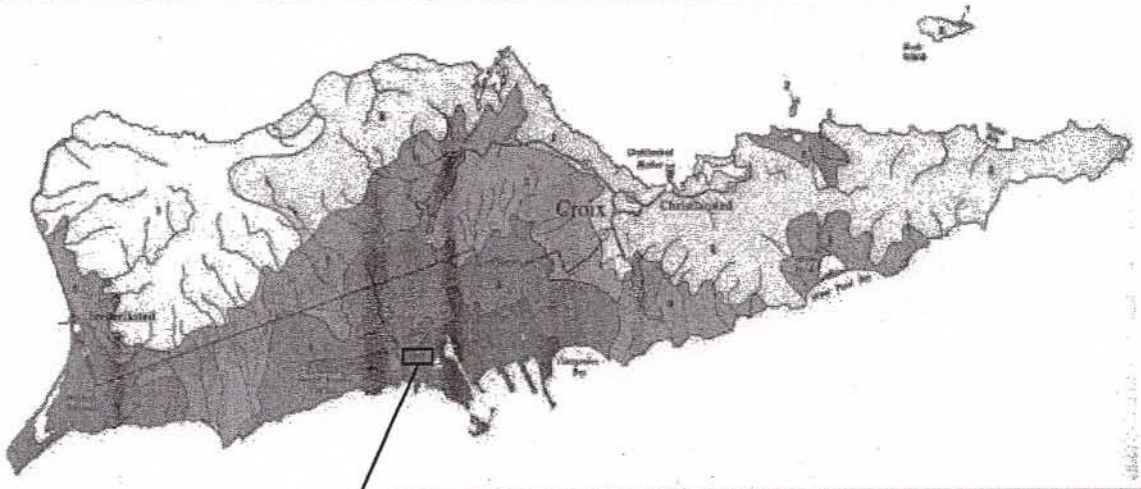
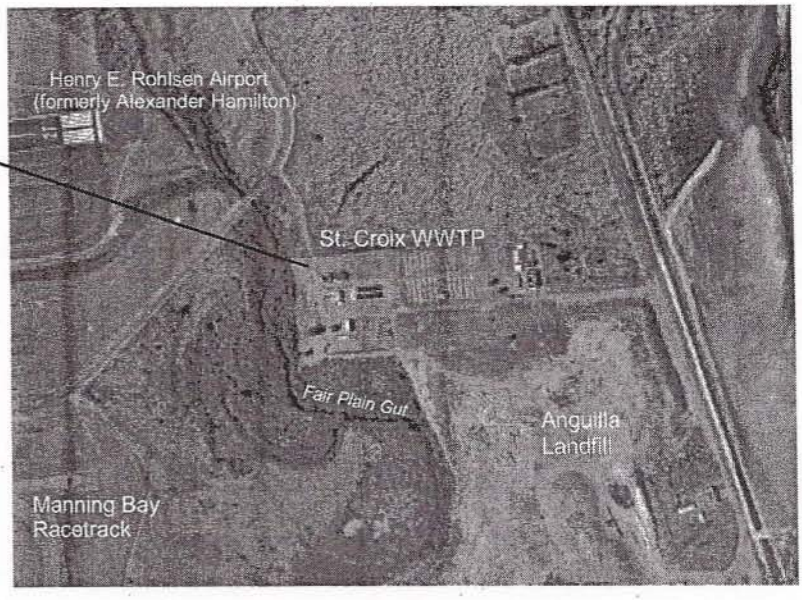
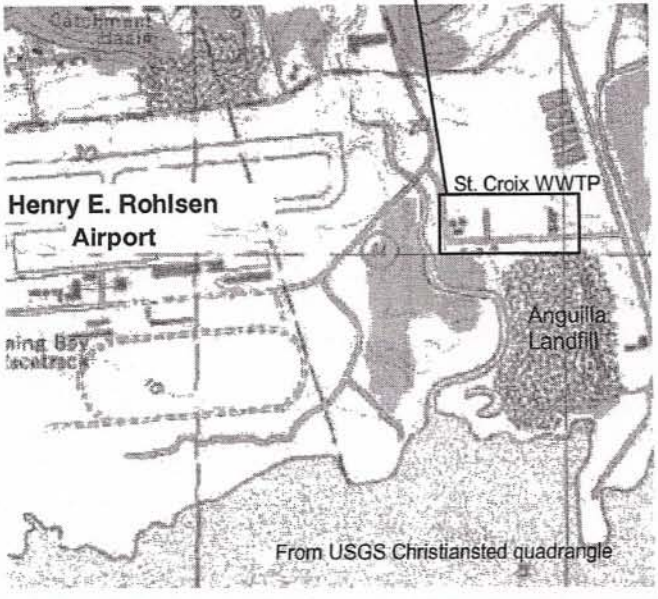


Project Location





Wastewater Treatment Plant Upgrade Project
St. Croix, U.S. Virgin Islands
May 2004

MAGNUM GROUP

Environmental Assessment Report
Project Location
Figure 2-1

Albert M. Nelthropp Waste Water Treatment Plan Improvements

EPA NPDES Form 2A Application - Additional Information

Project Background

In 1984, EPA determined that the existing St. Croix Waste Water Treatment plant (WWTP) was in violation of certain provisions of the Clean Water Act. As a result, the GVI was ordered to improve daily operations at the primary treatment facility and address violations in effluent quality.

A September 27, 1985 Consent Decree between the EPA and the GVI stipulated corrective actions and a timetable for compliance. At the time of this decree, the GVI had applied for a waiver of secondary treatment requirements pursuant to Section 301(h) of the Clean Water Act (33 USC §1311(h)) and modifications to its existing Territorial Pollutant Discharge Elimination System (TPDES) permit.

On January 19, 1996, an Amended Consent Decree, which superseded the original decree, was approved. The substantive elements of this decree remain in force, together with modifications issued in a 2002 Stipulation Modifying Amended Consent Decree (Stipulation), which adjusted the compliance schedule and penalties set forth in the Amended Decree, as well as mandated plant operation by a private contractor.

The 1996 Amended Consent Decree provided a compliance schedule for improving effluent quality under two scenarios. Approval of the GVI's application for Section 301(h) waiver would have allowed the plant to continue operating as a primary treatment facility, in accordance with conditions enumerated in the Amended Consent Decree. Non-approval of the waiver, under the Amended Consent Decree, required a plant upgrade that would provide for secondary treatment. In October of 2000, the EPA indicated their intent to deny the application for waiver and the GVI, subsequently, withdrew the application and agreed to construct a secondary treatment facility. The Stipulation sets forth a revised schedule for upgrading the plant.

Construction and scheduling will proceed in accordance with the Amended Consent Decree, subsequent Stipulation filed by EPA, and addendum IV dated May 3, 2004.

Project Purpose

The proposed upgrade to secondary treatment will result in a safer and more efficient method of treating domestic wastewater, and will bring St. Croix's wastewater treatment process into compliance with effluent limitations and water quality standards for secondary treatment. Upgrading the plant to achieve secondary treatment standards will reduce human health risks and potential impacts to floral and faunal resources.

The proposed project will fulfill obligations set forth in the Consent Decree documents by

addressing deficiencies in current treatment methods, operations and effluent quality. In upgrading the plant and treatment operations, the GVI will be fulfilling requirements established by EPA pursuant to the Clean Water Act. In accordance with EPA's directive, the upgraded treatment plant will be managed, operated and maintained by a private contractor, in partnership with the GVI. Contractual requirements between the GVI and the operator determined most of the design parameters for the plant, as well as standards of treatment that must be achieved.

According to the Waste Management Authority (WMA), the population of St. Croix is approximately 50,000 and slightly declining. The St. Croix WWTP is the only facility currently serving the Island of St. Croix. Geographically, less than half the island is served by the collection system. The new St. Croix WWTP facility is expected to immediately serve 25,000 residents. Additional residents will be added as septic systems are taken off line and residents are hooked up to an extended collection system.

Project Description

Under the proposed design plan, the existing primary treatment plant will be repaired, modified and upgraded to achieve secondary treatment through the addition of three sequencing batch reactors (SBRs). The upgraded facility will occupy the same general site area as the existing plant and will retain and utilize most of the existing plant infrastructure and facilities (Figure 1-1). New site work will be limited to construction of the SBR tanks, the post equalization tank, UV disinfection and effluent filtration; a new operations/control building for the SBR system; and a blower building for the aerobic digesters.

Existing Facility

The existing St. Croix WWTP operates as a primary wastewater treatment facility, providing only screening, grit removal, primary settling, sludge digestion and sludge drying on beds. The plant, which primarily serves the communities of Christiansted and Fredericksted, provides primary treatment to an average domestic flow of about 3.1 mgd. The existing primary treatment facility was built in 1972.

At present, flows from the off-site service area are conveyed by two pumped forcemains and one gravity interceptor. These flows enter an influent collection structure and are conveyed to an on-site pumping station via a 48-inch pipe and then pumped to screening and grit removal devices at the headworks. Flow from the headworks is conveyed, by gravity, to two primary clarifiers. Effluent from the clarifiers is discharged through a 48-inch outfall pipe, approximately 8,000 feet long, that extends into the Caribbean Sea on the south side of the island.

Most of the plant facilities utilized in the current primary treatment process, including headworks, digesters, and settling basins, will be reconditioned, as needed, and converted for reuse. A portion of the site has facilities that are currently out of service. The old aeration tanks will be placed back in service as aerobic digesters for sludge from the SBRs. The existing plant administration building will remain.

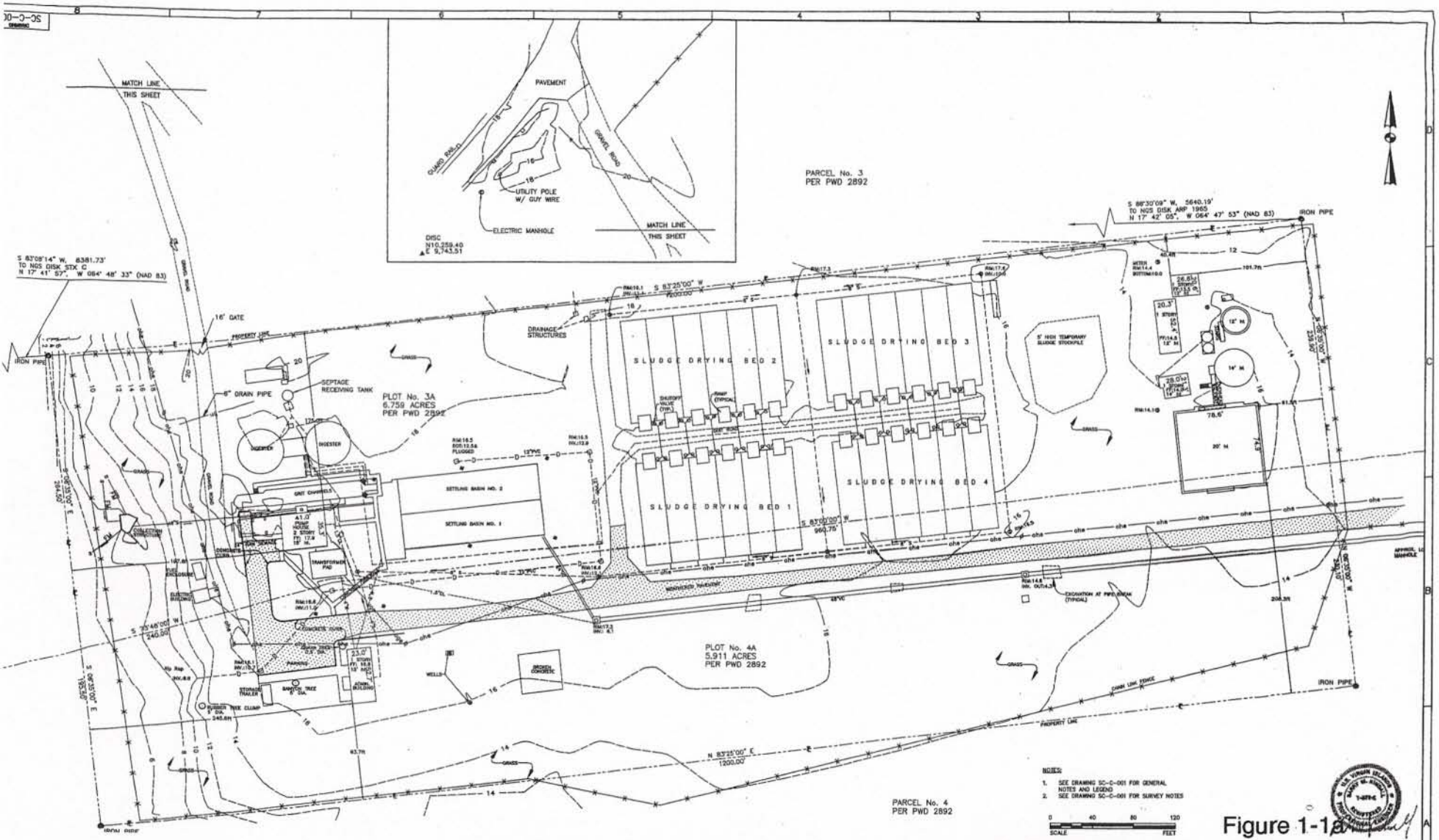


Figure 1-1

REV	DESCRIPTION	DATE	DES	CHK	ENG	MGR
0	ISSUED FOR CONSTRUCTION	12/27/04	JKM	GMP	JKM	RAW

Maguire Group Inc.
Architects / Engineers / Planners
1142 King Street
Christiansted, St. Croix USVI 00822

DESIGNER JKM	DATE 10/08/04
CHECKER GMP	DATE 12/22/04
ENGINEER JKM	DATE 12/22/04
MANAGER RAW	DATE 12/22/04
FILE 16957co002.dwg	
SCALE: AS NOTED	

TITLE: ST. CROIX WASTEWATER TREATMENT PLANT
EXISTING CONDITIONS

OWNER: GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS

VWNA CARIBBEAN

VWNA Caribbean, LLC
250 Alcade Drive, Moon Twp., PA 15108
(412) 809-6000 FAX (412) 809-6075

PROJECT	DRAWING	SHEET	REV
7056-02	SC-C-002	OF	0

BAR = 1" AT PLOT SCALE

2006 03:47:05 PM G:\JOBS\16957 Croix\ACAD\CIVIL\16957co002.dwg

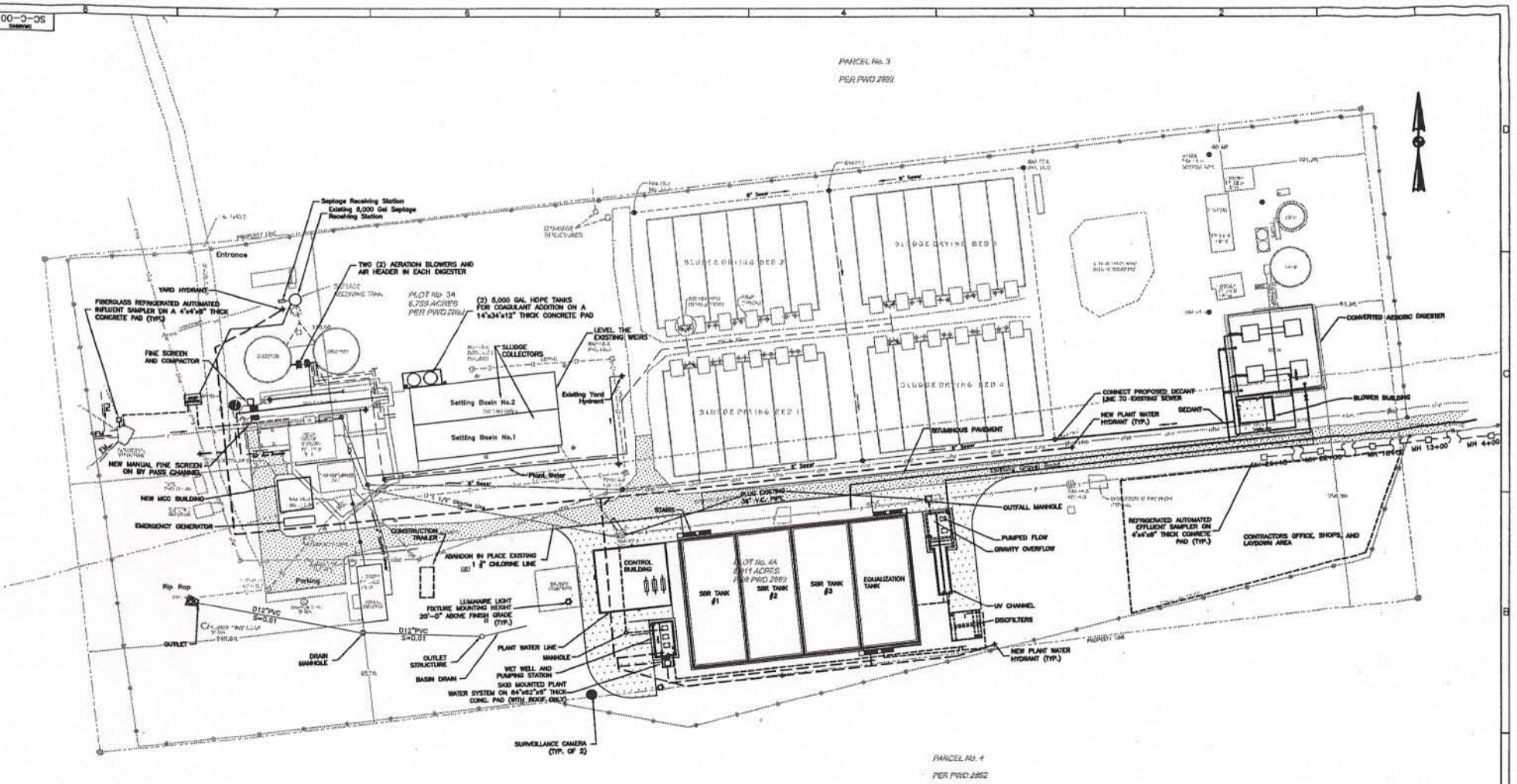


Figure 1-1b

CZM APPLICATION DRAWING

NOTE: This document is preliminary only and is not intended for any purpose except for permitting use.

NOT FOR CONSTRUCTION

Maguire Group Inc.
Architects/Engineers/Planners
One Court Street
New Britain, Connecticut 06051

REV	DESCRIPTION	DATE	DWN	CHKD	APVD
1	CZM PERMIT APPLICATION	6/30/06	GMP	APA	APA

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DESIGNER	JRM
DATE	6/30/06
CHECKER	
DATE	00/00/00
ENGINEER	
DATE	00/00/00
MANAGER	
DATE	00/00/00
FILE	16957co003.dwg
SCALE	1" = 40'

TITLE: ST. CROIX WASTEWATER TREATMENT PLANT
UTILITY PLAN

OWNER: GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS

VWNA CARIBBEAN

VWNA Caribbean, LLC
250 Abraide Drive, Moon Twp., PA 15108
(412) 809-6000 FAX (412) 809-6075

PROJECT	DRAWING	SHEET	REV
7056-02	SC-C-003	OF	1

1103-24x3601

BAR = 1" AT PLOT SCALE

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Proposed Secondary Treatment Plant

The new process equipment at the St. Croix WWTP will include the addition of an SBR system post equalization, aerobic sludge digestion, UV disinfection, and effluent filtration. The filtration equipment will be installed as part of this project but it will not be placed in service until users are ready to receive the reuse water. Under the new process, flow from the primary clarifiers will be intercepted prior to flowing to the ocean outfall and diverted to a new pumping station, which will convey flows to the SBR tanks for additional treatment by biological processes (Figure 1-2).

The primary effluent pumping station will include three submersible pumps, each with a capacity of approximately 4,500 gallons per minute (gpm). Two of the pumps will be capable of passing the required peak hour flow of 12 mgd; the third pump will be a spare. Flow into each SBR tank will be controlled by an electric actuated valve, allowing the flow to enter each tank separately. The water level in the SBR tanks will range from a high water elevation of 38.0 feet MSL to a low water elevation of 30.6 feet MSL.

The core of the new secondary treatment system is the SBR process. After evaluation of several potential treatment options, it was determined that the SBR process is the only one capable of meeting all the major project objectives, including permit compliance, site constraints and cost. The SBR system was selected not only for its ability to provide the best biological process, but it also offered the greatest cost effectiveness and long term value for meeting all the major project objectives including permit compliance.

Another important feature is that the SBR treatment process specified for the St. Croix WWTP is compatible with other existing and planned GVI treatment facilities. The SBR process and equipment is deemed suitable for all plant locations. Process compatibility and commonality at all plants provides efficiencies in the availability of spare parts, service options and training of personnel.

Biological Treatment and Nutrient Removal

Under current conditions, the court mandated interim effluent limits conditions require BOD and TSS to be 150 mg/l or less. The new process will be capable of treating an average influent flow of 4 mgd, or less, with an effluent quality of 30 mg/l BOD and TSS.

The new upgrades are designed to process up to 50,000 gpd of septage. The plant will also incorporate a reclaimed water system designed to further process effluent and produce up to 4 mgd of reclaimed water. The plant will be capable of treating an average daily influent flow (ADF) of 4 mgd, a monthly flow of 5.0 mgd and a peak 24-hour influent flow of 8.0 mgd and a peak hour of 12 mgd.

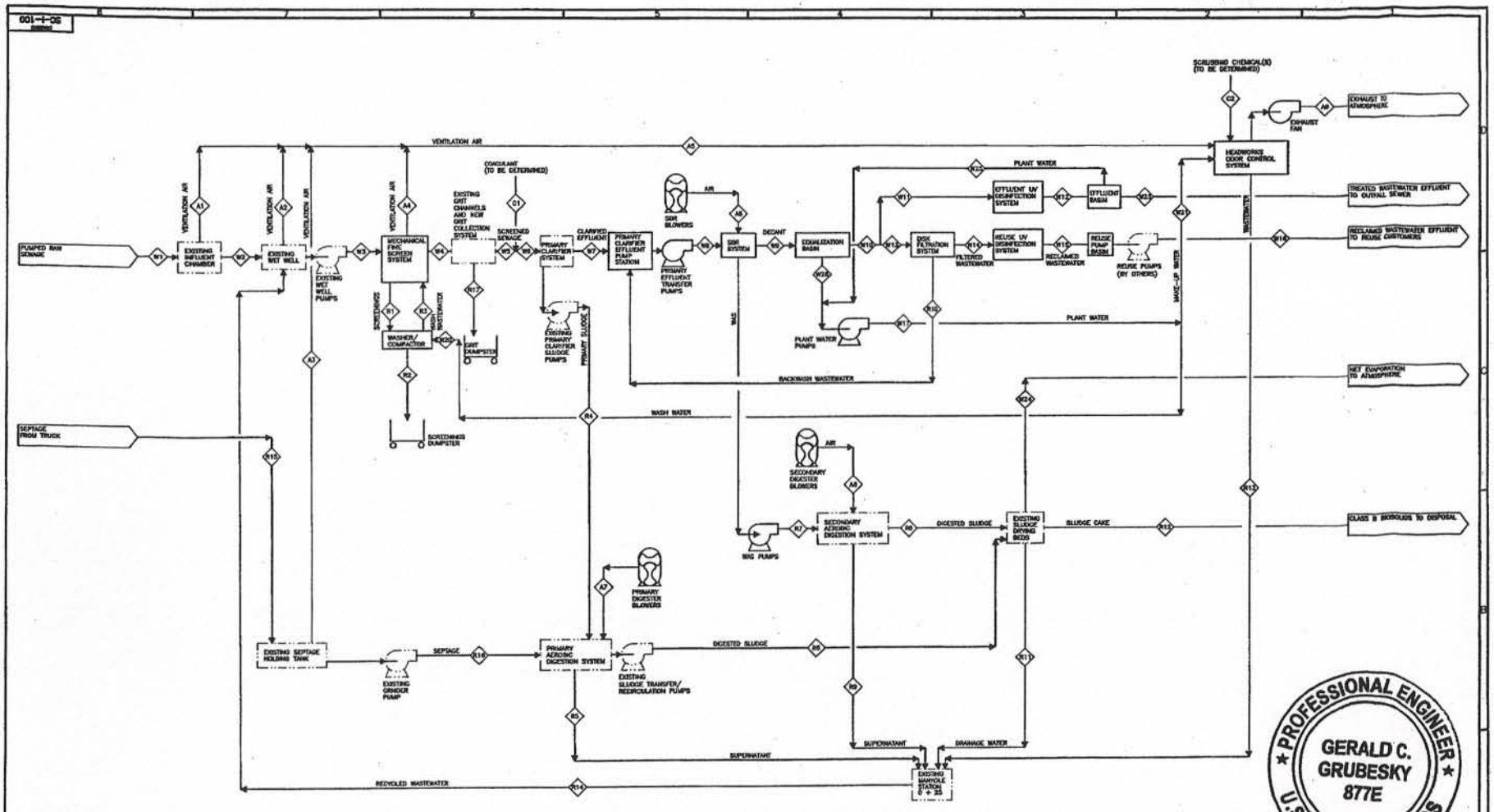

Figure 1-2a

NOTES:

1. THIS PROCESS FLOW DIAGRAM IS MEANT TO PROVIDE A BROAD OVERVIEW OF THE TREATMENT PROCESS SCHEME AND TO IDENTIFY THE PROCESS STREAMS WHOSE FLOWS ARE QUANTIFIED ON THE MASS BALANCE SHEET. THIS PFD IS NOT INTENDED TO INDICATE SPECIFIC EQUIPMENT QUANTITIES OR EQUIPMENT TYPES, UNLESS SPECIFICALLY STATED.
2. MAINTENANCE LINES (FOR DRAINING, BY-PASSING AND PERIODIC FLUSHING) AND OTHER NON-PROCESS RELATED LINES (E.G., POTABLE WATER, SEWER, AND FIRE WATER) ARE NOT SHOWN.

PROFESSIONAL ENGINEER
GERALD C. GRUBESKY
877E
U.S. VIRGIN ISLANDS
12-27-04

REV	DESCRIPTION	DATE	INV	BK	JK	TP
0	ISSUED FOR CONSTRUCTION	12/27/04	INV	BK	JK	TP

DESIGNED INV 02/16/05
DRAWN BK 12/27/04
CHECKED JK 12/27/04
APPROVED TP 12/27/04
FILE: 705602SC-I-100.DGN
SCALE: NONE

TITLE: ST. CROIX WASTEWATER TREATMENT PLANT
PROCESS FLOW DIAGRAM
CLIENT: GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS

VWNA CARIBBEAN
VWNA Caribbean, LLC
200 Ahnaka Drive, Moon Twp., PA 15108
(412) 809-6500 FAX (412) 809-6676

PROJECT 7056-02 | DRAWING 30-I-100 | SHEET OF | REV 0

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101-1-05

St. Croix WWTP Mass Balance Rev. 2

Process Flow Diagram Stream No.	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W20	W21	W23	W24	W25	W26	R1	R2	R3	R4
Service	Raw wastewater	Raw wastewater	Combined raw wastewater and recycled wastewater	Screened sewage	De-gritted, screened sewage	De-gritted, screened sewage after reagglant addition	Primary clarifier effluent	Primary clarifier effluent	SBR decant	SBR effluent	SBR effluent	Treated wastewater	SBR effluent	Tidal filter filtrate	Reclaimed wastewater	Reclaimed wastewater	Plant water	Plant water	Plant water	Treated wastewater	Net Evaporated water	Plant water	Plant water	Screenings	Compacted screenings	Wash wastewater	Waste activated sludge
Location	Influent of existing influent chamber	Influent of existing wet well	Inlet of mechanical fine bar screen system	Inlet of existing grit channels	Outlet of existing grit channels	Inlet of primary clarifier system	Effluent line of primary clarifier system	Inlet of SBR system	Decant line of SBR system	Effluent of EQ basin	Inlet of effluent UV disinfection system	Outlet of effluent UV disinfection system	Inlet of disk filtration system	Filtrate of disk filter system	Outlet of reuse UV disinfection system	Reuse pump discharge to reuse mainmain	Discharge line of plant water pumps	Wash water to compactor	Make-up water to odor control system	Discharge to outfall sewer	Net water evaporation rate from sludge drying beds to atmosphere	From UV effluent basin	From equalization basin	Screenings outlet of mechanical fine bar screen system	Screening outlet of compactor	Wash wastewater outlet of compactor	Discharge of WAS pumps
Liquid phase flowrate																											
Units specified as:	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	MGD	gpm	gpm	gpm	MGD	gpm	gpm	gpm	gpm	gpm	gpm	gpm
Average monthly (normalized)	4.0	4.0	[redacted]	4.1	4.1	4.1	4.0	4.1	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.7	1.7	1.0	2.0	9.5	0.5	2.2	0.04	0.01	2.6	56
Maximum monthly (normalized)	5.0	5.0	[redacted]	5.1	5.1	5.1	5.1	5.1	5.1	5.0	3.0	3.0	2.1	2.0	2.0	2.0	3.9	1.7	1.3	3.0	15.1	0.6	2.4	0.05	0.01	5.1	68
Peak instantaneous	12.9	12.9	12.7	12.7	12.7	12.7	12.7	12.7	12.9	8.2	8.0	8.0	4.1	4.0	4.0	4.0	99.2	28.8	1.4	8.0	15.1	99.2	99.2	0.08	—	29	590
Biochemical oxygen demand mass flowrate (normalized)																											
Average monthly (lb/day)	5,805	5,805	5,891	5,891	5,891	5,891	4,124	4,129	504	503	248	248	255	250	250	250	0.5	0.31	0.18	248	0	0.10	0.39	—	—	0.5	—
Maximum monthly (lb/day)	9,524	9,524	9,659	9,659	9,659	9,659	6,761	6,777	1,264	1,263	748	748	525	500	500	500	1.3	0.63	0.45	747	0	0.22	0.86	—	—	1.8	—
Total suspended solids mass flowrate (normalized)																											
Average monthly (lb/day)	10,002	10,008	10,163	10,062	9,900	9,900	4,375.5	4,547	504	503	248	248	255	83	83	83	0.5	0.31	0.18	248.0	0	0.10	0.39	102	97	8	5,741
Maximum monthly (lb/day)	13,375	13,375	13,428	13,492	13,276	13,436	5,769.7	6,202	1,264	1,263	748	748	515	83	83	83	1.1	0.63	0.45	747.5	0	0.22	0.86	136	129	11	6,902
Biochemical oxygen demand concentration																											
Average monthly (mg/L)	174	174	[redacted]	172	174	174	123	121	15	15	15	15	15	15	15	15	15	15	15	15	0	15	15	—	—	15	—
Maximum monthly (mg/L)	228	228	[redacted]	227	227	227	160	159	30	30	30	30	30	30	30	30	30	30	30	30	0	30	30	—	—	30	—
TSS concentration																											
Units specified as	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	% DS by wt	% DS by wt	mg/L	mg/L
Average monthly	300	300	[redacted]	296	292	294	330	134	15	15	15	15	15	5	5	5	15	15	15	30	0	15	15	20%	50%	350	8,300
Maximum monthly	321	721	[redacted]	317	312	325	197	145	30	30	30	30	30	5	5	5	30	30	30	30	0	30	30	20%	50%	700	8,300
Gas phase flowrate																											
Units specified as	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Maximum instantaneous flow*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average instantaneous flow*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chemical dosage and consumption																											
Actual concentration of chemical being dosed (by wt.)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dosage and consumption indicated below are reported as	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Maximum applied chemical dosage (mg/L)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average applied chemical dosage (mg/L)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Normalized average daily consumption (lb/day)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

St. Croix WWTP Mass Balance Rev. 2

Process Flow Diagram Stream No.	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	A1	A2	A3	A4	A5	A6	A7	A8	A9	C1	C2
Service	Supernatant from primary digester	Digested sludge from primary digester	Waste activated sludge	Digested sludge from secondary digester	Supernatant from secondary digester	Backwash wastewater	Drainage water from sludge drying beds	Sludge cake	Wastewater from odor control system	Recycled wastewater	Septage	Septage	Grit	Ventilation air	Ventilation air	Ventilation air	Ventilation air	Ventilation air	Air	Air	Air	Exhaust air	Coagulant - To be determined	Scrubbing chemical(s) - To be determined
Location	Primary digester supernatant line	From digester sludge outlet to drying beds	Discharge of WAS pumps	From digester sludge outlet to drying beds	Secondary digester supernatant line	Disk filtration system wastewater outlet	From sludge drying beds to existing manholes station 0 + 25	Sludge cake accumulation on sludge drying beds	Wastewater outlet of odor control system	Outlet of existing manhole station 0 +25	From septage truck into existing septage holding tank	Discharge of septage pump to primary digesters	Grit from grit collection system	From existing influent chamber	From existing wet well	From existing septage holding tank	From mechanical fine bar screen system	Inlet of odor control system	Total from SBR blowers to SBR system	Total from blowers to primary digester system	Total from blowers to secondary digester system	Outlet of odor control system to atmosphere	Inlet of primary clarifier system	Inlet of headworks odor control system
Liquid phase flowrate																								
Units specified as:	gpm	gpm	gpm	gpm	gpm	gpm	gpm	CY / day	gpm	gpm	gpm	gpm	gpm	—	—	—	—	—	—	—	—	—	gph	gph
Average monthly (normalized)	13.5	13.4	15.0	9.7	25.2	28.3	13.4	8.5	1.0	52.1	3.5	3.5	0.01	—	—	—	—	—	—	—	—	—	TBD	TBD
Maximum monthly (normalized)	22.4	21.6	48.3	14.1	34.1	42.9	18.8	13.6	1.3	76.5	10.4	10.4	0.02	—	—	—	—	—	—	—	—	—	TBD	TBD
Peak instantaneous	500.0	500.0	200.0	500.0	300.0	150.0	50.0	—	1.4	900.0	—	150.0	—	—	—	—	—	—	—	—	—	—	TBD	TBD
Biochemical oxygen demand mass flowrate (normalized)																								
Average monthly (lb/day)	49	—	—	—	13	5	22	—	0.18	86	292	292	—	—	—	—	—	—	—	—	—	—	—	—
Maximum monthly (lb/day)	91	—	—	—	20	15	54	—	0.45	135	876	876	—	—	—	—	—	—	—	—	—	—	—	—
Total suspended solids mass flowrate (normalized)																								
Average monthly (lb/day)	49	4,605	3,569	2,247	91	172	15	6,836	0.18	135	626	626	161	—	—	—	—	—	—	—	—	—	—	—
Maximum monthly (lb/day)	107	7,693	4,936	3,299	123	432	23	10,967	0.45	253	1877	1877	216	—	—	—	—	—	—	—	—	—	—	—
Biochemical oxygen demand concentration																								
Average monthly (mg/L)	200	—	—	—	50	15	150	—	15	138	7,000	7,000	—	—	—	—	—	—	—	—	—	—	—	—
Maximum monthly (mg/L)	300	—	—	—	50	30	150	—	30	147	7,000	7,000	—	—	—	—	—	—	—	—	—	—	—	—
TSS concentration																								
Units specified as	mg/L	% DS by wt	mg/L	% DS by wt	mg/L	mg/L	mg/L	% DS by wt	mg/L	mg/L	mg/L	mg/L	% DS by wt	—	—	—	—	—	—	—	—	—	—	—
Average monthly	300	2.9%	8,300	1.9%	300	502	100	40%	15	247	15,000	15,000	70%	—	—	—	—	—	—	—	—	—	—	—
Maximum monthly	400	3.0%	8,300	1.9%	300	858	100	40%	30	276	15,000	15,000	70%	—	—	—	—	—	—	—	—	—	—	—
Gas phase flowrate																								
Units specified as	—	—	—	—	—	—	—	—	—	—	—	—	—	acfm	acfm	acfm	acfm	acfm	acfm	acfm	acfm	acfm	—	—
Maximum instantaneous flow*	—	—	—	—	—	—	—	—	—	—	—	—	—	225	680	80	730	2,000	3,364	2,000	2,208	2,000	—	—
Average instantaneous flow*	—	—	—	—	—	—	—	—	—	—	—	—	—	225	680	80	730	1,715	3,364	2,000	2,208	1,715	—	—
Chemical dosage and consumption																								
Actual concentration of chemical being dosed (by wt.)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	TBD	TBD
Dosage and consumption indicated below are reported as	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	TBD	TBD
Maximum applied chemical dosage (mg/L)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	TBD	TBD
Average applied chemical dosage (mg/L)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	TBD	TBD
Normalized average daily consumption (lb/day)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	TBD	TBD

PROFESSIONAL ENGINEER
GERALD C. GRUBESKY
#776
VIRGIN ISLANDS
12-27-04

Figure 1-2b

REV	DESCRIPTION	DATE	DES	CHK	ENG	MGR
0	ISSUED FOR CONSTRUCTION	12/27/04	WJK	BK	JK	TP

DESIGNED WJK 10/14/04
CHECKED GBK 12/27/04
ENGINEER JK 12/27/04
MANAGER TP 12/27/04
FILE: 70560250-1-101.DWG
MICHAEL HOKE

TITLE: ST. CROIX WASTEWATER TREATMENT PLANT
MASS BALANCE FLOW SHEET
PROCESS FLOW DIAGRAM
CLIENT: GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS

VWNA CARIBBEAN
VWNA Caribbean, LLC
2300 Kronke Drive, Store Top, PA 18109
(412) 809-8000 FAX (412) 809-8070

PROJECT 7056-02
DRAWING 50-1-101
SHEET OF
REV 0

9701-1102-2403801
BAR = 1" AT PLOT SCALE
12/23/2004 03:08:23 PM R:\Project\705602\705602SC-1-101.DWG

The basic design parameters for the system are as follows:

Raw wastewater (@WWTP Inlet)	174 mg/l BOD; 300 mg/l, TSS at ADF
Hydraulic retention time (ADF):	18 hours w/ 3 tanks; or 12 hours w/ 2 tanks
Internal Tank Dimensions (three provided)	118 feet long; 51 feet wide; 24 feet deep; 22 foot swd (each)
Tank volume	990,332 gallons; 2,970,996 gallons total
Decant rate	12 mgd average for approximately 45 minutes
Batches per day	four per tank; six-hour full cycle time

The plant will be designed to meet the required effluent criteria, as indicated in Table 1-1.

TABLE 1-1
EFFLUENT PERFORMANCE GUARANTEES

PARAMETER	PERFORMANCE VALUE		
	DAILY (1)	30-DAY AVERAGE	7-DAY AVERAGE
BOD_5, mg/l Percent Removal		30 maximum 85% minimum (4)	45 maximum
TSS, mg/l Percent Removal		30 maximum 85% minimum (4)	45 maximum
pH	6.0 to 9.0		
Fecal Coliform (2) (#/100 ml)	70		
Fecal Coliform (3) (#/100 ml)	400	200	

Note:
(1) The daily performance value establishes the maximum allowable for each and every sample collected in a day.
(2) Limit is to be achieved at the edge of the mixing zone defined in USVI Code Title 12, par.186-6 with a radius equal to the square root of the volume of discharge expressed as million of gallons per day times 200 feet and in no case shall exceed 3/8 mile.
(3) Measurement obtained at the discharge from the effluent disinfection channel.
(4) Conditions for relief of the Effluent Performance Guarantee for 85% removal of BOD_5 and TSS shall be as set forth in the final TPDES permit.

The SBRs will be equipped with a common packaged redundant microprocessor control system, and each SBR will be provided with a dedicated aeration system, decant system, waste-activated sludge pump, instrumentation and other appurtenances. A post-SBR equalization tank with a volume of 537,000 gallons, will be provided, with piping to convey effluent to either the effluent UV disinfection system or the reclaimed water facility.

Post-processing Equalization

The SBR system decants a large volume of flow after the clarification cycle, therefore a 537,000 gallon equalization tank has been provided to moderate flows to the outfall and ensure that hydraulic capacity is not exceeded. Without the tank, a decant flow rate of about 8,354 gpm (about 12 mgd) would be discharged to the outfall in approximately 40 minutes. This is a total flow of about 333,333 gallons per decant. With the equalization tank, flows can be controlled and limited to the average daily design flow of 4 mgd. With the batch SBR process and the equalization tank, the peak hourly flow of 12 mgd, and hydraulic capacity of the SBR process or outfall, can be controlled. The size and condition of the existing outfall is sufficient to handle the average daily design flow of 4 mgd and the peak hourly flow of 12 mgd.

Disinfection

The upgraded treatment plant will include a dual-channel UV disinfection system with one channel dedicated to beneficial reuse and the other dedicated to a normal discharge to the ocean outfall. A key reason for selection of UV for disinfection is to enable the system to provide up to 4 mgd of reuse water.

The equalization tank will attenuate flow variations to within the maximum daily flow of 8 mgd. As configured, there will be two parallel effluent channels, with flow in the reuse channel controlled to an average of 2 mgd (peak flow of 4 mgd). The balance of the flow in excess of 4 mgd will be diverted through the discharge UV channel for disinfection at discharge dosages. The non-reuse UV system has been sized to be able to treat the 24-hour maximum daily flow of 8 mgd, since the peak hourly flows are attenuated in the SBR and post equalization tank.

The UV lamp configuration in each channel will be different, as the disinfection dosage required for the reuse water will be significantly higher. The reuse channel will use three sets of lamps, while only two sets of lamps will be used in the wastewater channel. Reuse water will also be filtered through a disk filter prior to disinfection. It is anticipated that the non-reuse channel will have sufficient capacity to process 100 % of the plant flows if reuse is not in service. As a backup, both channels can be used for discharge disinfection, as the discharge wet well for the future reuse pumps will be designed to overflow to the outfall. The dual system will also simplify expansion of the reuse system in the future, if desired.

Water Reclamation and Wastewater Reuse

The upgraded treatment plant will be designed to incorporate facilities that can achieve an effluent quality, suitable to accommodate future effluent reuse options (e.g., agricultural land application). The treatment plant will not land apply treated wastewater on the treatment plant property. To date, an end user has not been identified; however, if and when an end user does emerge, the plant can accommodate reuse with the addition of pumps and a reuse watermain. In order to be acceptable for reclamation, the effluent must meet the criteria indicated in Table 1-2.

TABLE 1-2
EFFLUENT CRITERIA FOR RECLAMATION

PARAMETER	VALUE	FREQUENCY AND LOCATION
TSS, mg/l	5.0 (max.)	Continuous turbidity measurements prior to application of disinfection
Fecal coliform	No detect in at least 95% of monthly samples	Daily samples collected post-disinfection and analyzed for fecal coliform (count/100 ml).
Fecal coliform	25/100 ml	Maximum fecal coliform count in any one sample

The plant's design provides for continuous filtration of the reuse portion of the effluent (up to 4 mgd) using two 2-mgd (each) Hydro Disc filters. These will provide the ability to meet the 24-hour average daily flow of 4 mgd for reuse. If there are times when there is no flow required for reuse, the filters can be bypassed and flow can be directed to the standard UV disinfection system and treated for discharge to the ocean outfall.

The UV system is sized to treat up to 4 mgd for water reuse, with two operating banks and one standby bank. At the dosage rate required for water reuse (about 2.5 to 3 times the dosage for secondary effluent discharge), the reuse UV can handle up to 8 mgd for secondary treated sewage.

Once an end-user(s) is identified, a pumping station will need to be constructed to deliver disinfected reuse flow to the user(s). The design includes an overflow weir in the pumping station wet well to maintain a head in the wet well and allow for all flow not pumped to end-user(s) to be directed to the existing outfall. Since this flow will be fully treated, filtered and given a higher does of UV light, the final effluent discharged to the outfall will be far superior to secondary effluent.

In the future, there will need to be two pumps installed (by others) in the pumping station. Once the feasibility and technical details are known, the pump station can be designed to transfer reuse water to customers or storage. The pumps could be submersible type. Since the location of the end user(s) is not known, the size and horsepower of the pumps cannot be determined at this time. Given the general area where use of the water is anticipated if the reuse option is employed, a pipeline as long as 10,000 to 15,000 feet, with static heads approaching 120 feet may be required.

Sludge Processing and Disposition

Management of biosolids, including handling, storage, processing, transportation, disposition and/or beneficial use will be accomplished in accordance with all applicable laws. Aerobically digested biosolids will conform to a Class B product standard, in accordance with 40 CFR Part 503, achieving greater than 38% volatile solids reduction and the required levels of pathogen reduction.

Primary sludge will be aerobically digested in the two existing anaerobic digester tanks, which will be converted to aerobic digesters. The two tanks have a combined capacity of

approximately 414,000 gallons. New blowers and coarse bubble diffusers will provide the oxygen required for digestion of biosolids, prior to dewatering on the sludge drying beds.

The capacity of the digesters is designed for a volatile solids reduction of at least 38%. The digesters will contain telescoping valves to enable gravity thickening and return of supernatant to the plant recycle pump station for further treatment. The existing aeration tanks will also be converted into aerobic digesters to process waste-activated biosolids from the new SBR system. The aerobic digestion tank has two compartments of approximately 336,600 gallons each. The sludge stabilization systems will provide at least 15 days solids detention time.

The primary and secondary aerobic digested biosolids will be applied to three of the existing drying bed areas. The fourth drying bed area is reserved for dewatering and drying of residuals from a local company. Once the air-dried biosolids are removed from the drying beds, the dewatered, semi-dry product will be disposed of. The GVI's plan is to either open an EPA approved lined sludge cell in which case sludge can be stored for later use as a "fuel" in a waste to energy facility or as a component of a composting operation. The WMA also is considering a sludge processing system such as the "Bioset" system to treat sludge and turn it into two marketable products, a liquid fertilizer and a ground modification medium. St Croix sludge will be properly handled and disposed of upon Anguilla Landfill closure.

Odor Control

The treatment facility will be designed with an odor control system that conforms to standards set forth in the contractual agreements for plant design. A maximum atmospheric hydrogen sulfide (H_2S) level of 10 parts per billion (ppb), measured at the fence line surrounding the plant, shall be achieved.

Site Development and Construction

The St. Croix WWTP upgrade will occur within the existing plant site, located southeast of the Henry E. Rohlsen Airport and immediately adjacent to the northwest corner of the Anguilla Landfill. Project activity will occur mainly within existing structures, except for construction of the new SBR, equalization tank, UV disinfection, effluent filtration, blower building and control building. The three new SBR tanks, as well as the equalization tank will occupy a portion of the site directly south of the existing sludge drying beds. These structures will be constructed on previously filled and graded ground that is currently mowed grass.

Access to the site will be through the existing gated entrance. Traffic circulation will be primarily to/from the existing administration building, the new control building and the septage receiving area. The existing parking spaces adjacent to the administration building will remain. In this general area, a small drainage system will be provided to convey surface runoff to a rip-rapped swale.

A new bituminous concrete roadway extending from the existing administration building to the new aerobic digesters will be constructed. Additional new pavement will be applied to areas adjacent to the new SBR pumping station, filtering and disinfection systems, and the blower building.

Provisions to Limit Site Disturbance

All areas where new facilities will be located are already cleared open space, thereby limiting clearing, grubbing and excavation activities. Most of the existing piping network will remain in place and will remain as functional components of the system, minimizing the need to excavate and backfill for new pipe. Minimal earthwork is associated with construction of the SBR and equalization tanks, as the design elevation for the footings will be only a few feet below the existing grade.

Sediment and Erosion Control Measures

Sediment and erosion control measures will be installed, as appropriate, adjacent to all areas where site disturbance will occur. All measures must be in place prior to initiating any on-site excavation, stockpiling or construction activity. Standards and best management practices will be employed in accordance with the *USVI Environmental Handbook.*

Because site activity will not occur near sensitive resource areas or steep grades, and will include only limited excavation and site disturbance, basic measures such as installation of silt fencing should be adequate to minimize sediment transport and deposition. If, however, the planned area of disturbance is modified, or on-site conditions indicate a need for additional controls, appropriate steps will be taken during construction. In addition to silt fencing, other measures that have proven effective in minimizing erosion and sedimentation impacts may be necessary. These measures typically include, but are not limited to, sedimentation basins, erosion control matting and lining, check dams, mulches, temporary and permanent seeding, slope drains, ditches, channels, riprap and temporary grading.

The site is just east of Fair Plain Gut, an ephemeral stream with a densely vegetated riparian zone and floodplain that flows between the airport runway and the western boundary of the site. While construction activity will not occur in this area or in its vicinity, precautions will be taken to ensure protection of the Gut by installing sediment control devices, as appropriate, and prohibiting construction equipment or stockpiling near this area.

Silt fencing shall be installed downslope from the stockpile. All exposed soils shall be seeded and mulched.

Maintenance

All sediment measures, controls and structures shall be inspected on a periodic basis, as well as immediately following storm events to ensure optimal effectiveness. As part of the inspection and maintenance activity, accumulated sediment and debris shall be removed, and any devices that are in disrepair shall be repaired or replaced, as necessary. In the event that severe storm activity is forecasted, all sediment and erosion control devices shall be inspected in advance; in some instances, installation of additional or backup measures will be necessary.

Stormwater Management

Drainage patterns will remain unchanged throughout much of the project area. The perimeter of the site will continue to drain via sheet flow over existing grass surfaces. Those portions of the site drained by the existing small piped storm drainage system will continue to do so. Impervious surfaces are being constructed in the form of new buildings, equipment and new pavement. Stormwater management techniques will be employed to control both the rate and quantity of runoff from these surfaces. Additionally, stormwater management techniques will be utilized to address water quality issues by reducing the TSS in runoff from the new pavement.

A majority of the increase in impervious surfaces will be offset by the SBR and equalization tanks which are open topped and will produce no runoff. The 22,600 square feet of pavement and 7,900 square feet of buildings totals 30,500 square feet and is almost offset by the 25,300 square feet of open topped SBR tanks. The net increase in impervious surface is only 5,200 square feet which is approximately 1% of the total 12.7 acres of the WWTP facility.

Stormwater management will be provided by a combination of several methods. Pavement will be sloped to direct runoff to grass swales and grass shoulders. The swales and shoulders will direct runoff to a detention basin, which will retain runoff and hold runoff from the water quality storm for approximately three days. In addition to detaining this runoff, the basin will drain through a slotted pipe with a combination filter fabric, sand and crushed stone filter, further improving the quality of the runoff. Moderate sized storms which exceed the capacity of the basin will discharge through a catch basin grate at the top of the outlet structure. Runoff from the filtered drain and catch basin will be conveyed via a new piped drainage system to an outlet immediately adjacent to the existing storm drain outlet. Riprap will be installed at the outlet to disperse and slow runoff before reaching lawn areas immediately down slope. Runoff from large storms will fill the basin to capacity and then flow across a broad grass outlet and then across shallow sloping lawn areas. Runoff from both the piped outlet and overflow from the detention basin flows over moderate grass slopes before entering Fair Plain Gut, which currently receives runoff from the site and flows south to the Caribbean Sea.

Maintenance of Stormwater Facilities

Maintenance of the stormwater facilities will consist of routine mowing of grass areas, periodic inspection of riprap, pipe outlet and the inlet structure. Any moved or dislodged pipes, structures or stone riprap will be reset or otherwise repaired. Accumulated sediment and debris will be removed from the detention basin as necessary.